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—THE— CANADIAN ARCHITECT AND BUILDER,

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(With a Weekly Intermediate Edition—The Canadian Contract Record).

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ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS,
DECORATORS, BUILDERS, CONTRACTORS, AND MANU-
FACTURERS OF AND DEALERS IN BUILDING
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Contributions of technical value to the persons in whose interests this journal is published, are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

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THE introduction of iron and steel skeletons for the support of large buildings is said to have lessened to a very large extent the demand for brick.

REFERRING to the illustration of the proposed new union station at Toronto, published in this journal, the *Architectural Era* says: "We had the pleasure of seeing the original drawing in Toronto recently, and it seemed to us to be one of the most pleasing compositions yet produced in the Province."

A New Hampshire granite manufacturer states that it will take ten years for the industry to regain the position which it occupied prior to the recent strike of granite cutters. It would be interesting to know what advantage the strikers expect to derive as the result of the injury which they have been the means of inflicting upon this important industry.

THE next number of the ARCHITECT AND BUILDER will be issued from new publication offices, Rooms 106, 107 and 108 Confederation Life Association Building, Richmond and Yonge streets. We shall there enjoy better facilities for the carrying on of our work, and shall be pleased to see as many of our friends as can make it convenient to visit us.

The opinion of the citizens of St. John's, Nfld., was that the cathedral destroyed in the recent conflagration, was fire proof. Consequently when the fire broke out, the building was made the storehouse for furniture and other combustible materials. A burning ember blown through the open door set fire to these materials, and belief in the ability of the structure to withstand fire was quickly dissipated.

SEVERAL accidents, some of a fatal character have lately resulted from the breaking down of derricks while under strain. There appears to be need for more careful examination of such apparatus, to give every possible assurance that it possesses the requisite strength. Equal care is required on the part of those who may be entrusted with its operation, in order that the lives of workmen may not be carelessly sacrificed.

The time has almost arrived when the Toronto Architectural Sketch Club should resume its regular meetings. It is to be regretted that owing to the prevailing dullness in building operations and other causes, several of the leading spirits of the organization have recently removed from the city. While the loss of these members will be severely felt, others should be found ready to take their places, and display like activity on behalf of the progress of the Club.

WHILE congratulating Messrs. Strickland & Symons upon having received the commission to prepare the plans and superintend the erection of the new union railway depot at Toronto, and the railway companies and the city upon the fact that the work has been entrusted to such capable hands, we may nevertheless point out that an opportunity existed for a most interesting competition. The subject is one which might well have engaged the thought of all the leading architects of the country. The palace hotel which it is said to be the intention of the C. P. R. to erect opposite to the new depot, might also form the subject of such a competition.

A DECIDED impetus has been given to the movement for the reduction of the hours of labor, by the signing by the President of the United States of an act recently passed by the Senate enacting that eight hours shall constitute a day's work on all public works, except in cases of extraordinary emergency. Any government agent or contractor who shall violate this law, will be liable to a fine not exceeding \$1,000, or to a fine and imprisonment, at the discretion of the court.

The Toronto Builders' Exchange, a list of whose officers may be found in this and future numbers of the ARCHITECT AND BUILDER, is still adding to its membership and in other respects proving a success. The exchange has delayed taking possession of its new and handsome suite of rooms, pending the paving of the southern portion of Victoria Street. This part of the street having now been asphalted, no time will be lost in making the change of premises, and in a short time the members of the Exchange and their friends will be asked to take part in a formal celebration of the event.

LERNARD HEUKLE, a resident of Rochester, gravely announces his purpose to erect "the largest building on earth," in the shape of a power house at Niagara Falls. The building, which is to cost about \$35,000,000 is expected to pay six per cent. on an investment of \$256,000,000. It is a fortunate thing for the management of the World's Fair that several years will be required for carrying out Mr. Heukle's plans. Otherwise visitors might be expected to give the Fair the go-by in favor of the greater exhibition at the Falls. The architectural world will anxiously wait for the publication of the plans of this structure which is to dwarf the pyramids.

YOUNG architects who have not been practicing long and whose clientele is not large, often find it profitable in more than one sense to do some work outside of architecture, for instance, designing of various kinds. Wall papers, bindings for books, title pages, photo engraving and even furniture, all offer a field for a clever designer in which to add to his income while it does not detract in the least from a proper professional dignity. Young architects whose means are small too frequently "go in" for the publication of works containing "designs for the million" to the great disadvantage of themselves and of their profession. By inquiry they might find many fields more profitable and less *infra dig.*

It would, no doubt, lead to the avoiding of defective construction, such as that referred to in our last issue, if there was an enactment in force in Ontario, similar to that which exists in Great Britain and the Province of Quebec. In Quebec, the law holds the architect and the contractor jointly responsible for the safe construction of buildings, for a period of ten years after their completion. An instance has come to our notice wherein a Montreal architect was compelled to pay between three and four thousand dollars, in consequence of the collapse of a building erected under his supervision some five years ago. Unfortunately for the architect in this case, the contractor had placed all his property in the name of his wife, and it was not possible to compel him to contribute his share of the amount.

IN another column will be found an article descriptive of experiments in the use of electricity for heating purposes, which have recently been in progress at Ottawa, Ont., together with illustrations of the devices employed. So successful have these experiments been, that the new method of heating is soon to be put to a practical test on an extensive scale. The result will be watched with much interest, more especially in view of the advancing price of coal. A vast waste of money and labor is involved in our present methods of heating. It may be regarded as certain that there will be substituted for them in the near future a method not less efficient and more cleanly and economical. It is by no means unlikely that electricity will be the chief agent in the reform.

A CANADIAN gentleman who lately inspected the buildings in course of construction for the Columbian Exposition, became firmly impressed with the idea that there was great danger of their being destroyed by fire during the progress of the Fair. To the frame-work of the buildings is nailed diagonally rough

boards, which in turn are covered with a material called "staff." Our informant states that should a spark find its way inside this hollow wall of highly inflammable material, it would be almost impossible to check its progress. The vast extent of the buildings, besides increasing the probability of fire, would greatly add to the difficulty of subduing it. The extensive precautions being taken against the possibility of fire, serve to indicate that the management are not unaware of the dangerous conditions above referred to.

A CONTRIBUTOR to an English professional journal recommended the use of a solution of common salt to prevent the accumulation of the unsightly efflorescence that so frequently appears on the surface of brickwork. The usual remedy, if such it can be called, is to apply a solution of muriatic acid, but it is by no means absolutely effective. This trouble has bothered architects and builders for years, and so far no remedy has been found. An explanation of the efflorescence is simple enough. When a clay from which a brick is made contains magnesian lime, the trouble will occur. A brick being absorbent, the water soaks in, and dissolving the magnesia, effloresces on the surface of the brick. Why should not architects specify that no brick is to be used that will effloresce. The result would simply be that brickmakers would cease to use clay that contained magnesian limestone.

ARRANGEMENTS are being made for the annual meeting of the Province of Quebec Association of Architects, which will take place in Montreal on the 29th inst. We hope that every effort will be made to ensure the success of this meeting. A feature which has been absent from former meetings, has been the reading of papers on architectural subjects; such papers, when read at the meetings of the Ontario Association, have awakened profitable discussion, and have been of lasting benefit to the members. We have no doubt that similar results would follow the reading of papers at the meetings of the sister Association of Quebec, and we are pleased to see that a departure is to be made in this direction at the approaching meeting. It will be remembered that the Ontario Association, at its last convention, had the pleasure of a visit from Messrs. Hutchison and Clift of Montreal, representing the Quebec Association, and it is to be hoped that the desire for a better acquaintance thus manifested by the Quebec Association will be reciprocated by the architects of Ontario. The Ontario Association should appoint some of its members a delegation to Montreal on the 29th inst., and these delegates should go prepared to offer such advice and encouragement to the younger Association as will tend to awaken the enthusiasm of the members for the carrying out of the objects which the Association was formed to accomplish.

IT is surprising that concrete is not used to a greater extent than it is. There is so much material, such as slag from the iron works, available for the purpose that the cost of concrete should be quite low. Although pebbles are employed for ballast in making concrete, with the addition of sand and cement or lime, any hard material answers equally as well; in fact concrete gives ample opportunity for the utilization of the waste products of many industries. Of course a hydraulic cement such as Portland is the proper thing to use in making concrete. It not infrequently happens, however, that the expense is too great, and lime is used instead. It is of great importance to remember that pure lime—that is one that will not set in the presence of water—is practically useless for this purpose. Pure lime, called also rich lime because of its rich or fatty appearance when slaked and mixed, is only suitable for interior work such as plastering. The proper limes to use for concrete and mortar are those of the hydraulic class, called also "poor" limes. These have proportions of material other than lime in their composition, such as iron, silica, etc., which gives them the property of setting under water. A "pure" lime can readily be distinguished from a "poor" lime by the fact, that while the former gives out a good deal of heat and steam in slacking, the latter does not. Limes used for building purposes too frequently lack the hydraulic qualities.

THE new building ordinance which has recently gone into operation in Boston, and which is regarded as a model of its class, provides that no buildings, excepting wharf sheds and

grain elevators, shall hereafter be put up a height of more than 70 feet or an area greater than 10,000 square feet, unless strictly of incombustible materials; that no building, to be used above the first floor for mercantile, manufacturing or storage purposes, can be put up having a height of more than 45 feet unless constructed wholly of incombustible material or with floors of grooved planks at least two inches thick; that no building of any kind or material will hereafter be allowed exceeding a height of 125 feet, and brick, stone, or iron buildings must have party or bearing walls of brick carried at least one foot above the roof. These must be plastered directly upon either solid masonry or metal lathing. All columns or beams bearing weight must be protected by brick, terra cotta or other incombustible material. Doorways in partition walls cannot exceed two upon each floor, and these must be protected by double, tin-covered doors hung to iron frames. Buildings, except offices and dwellings within 30 feet of an exposed opening, must have fire-proof shutters, and all elevators must be of solid brick, or other incombustible material, and the openings furnished with metal-covered doors.

Now that the agreement between the city of Toronto and the Railway Companies has been signed and the works put in hand it is time to consider what may be done to improve the appearance of the water front. No one who has seen Toronto from the water, will say that there is not plenty of room for improvement, and we are inclined to think that it is not generally known as it might be that the proposed water front park is not part of the programme now. The new street which is to begin at the water-works and run east along the whole front of the city, behind the wharfs and docks, at present promises no better an appearance than exists with the esplanade. After a few years, probably, warehousees and such buildings will be erected upon it, and these, though no doubt very necessary, are not likely to be noted for architectural beauty. We can see no very great reason why that large area, which was to have been the site of a C. P. R. station—south of the tracks and west of the present steamer landings and sheds—should not be made into a public garden or park, with an "embankment," on the principal of the Thames embankment, London, with a handsome water wall. This park would be reached by York street and the bridge which is to be constructed to give access to the water over the tracks, so that there would be no risk to the public in having to get to the south side of the tracks. It is all very well to urge that the Island Park is being made into a resort which gives great delight and immense advantages to the citizens, but it costs ten cents to get there and back every time, while here is a fine space, which, if made into a park would be a boon to a great many and would be a decided improvement to the appearance of the city. We may mention in passing, that it is a pity some rather less commonplace name could not have been found for the new street; "Lake Street" is not only commonplace but senseless, as it has nothing whatever to do with the lake. "Bay Street" would have been more *appropriate* perhaps, but there is already a street of that name, and perhaps such a name would have been equally poor. We leave it to others to choose a name, but register our objections to "Lake Street." A park here would be a great advantage to travellers, who while waiting for trains could rest in the gardens in preference to the waiting-rooms of the station. Toronto water-front needs some redeeming feature; it can never be like Montreal's quay or even that at Kingston, and at present it is only one degree better than Hamilton. Toronto is an entirely different class of city to Montreal, and a garden front at the point where all incomers arrive, whether by boat or train, would be decidedly in keeping with the character of the city.

ILLUSTRATIONS.

CLUB HOUSE FOR THE TORONTO ATHLETIC CLUB.—E. J. LENNOX, ARCHITECT, TORONTO.

CHURCH OF ST. JOSEPH, ST. MARVS, ONT.—POST & HOLMES, ARCHITECTS, TORONTO.

MANTEL IN PROVOSTS ROOM, GLASGOW MUNICIPAL BUILDINGS.

COTTAGE AT SCARBORO', ONT.—E. B. JARVIS, ARCHITECT.

The whole of the exterior is shingled from roof to the ground. The shingles are stained as follows: roof, red; gables, raw sienna; and ground floor a grey tint. The wall and ceilings

inside are stucco finish, tinted. The hall is sheeted up to the frieze, then stucco frieze and ceiling.

THE TORONTO COURT HOUSE DIFFICULTY.

THE Toronto Court House has been at home of almost unceasing interest from one cause or another ever since its inception. In the face of the many stories in circulation, and the difficulty of getting at the actual facts, we have up to the present refrained from commenting upon the case. The crisis having at last been reached by the entry by force of the architect upon the premises and the exclusion of the contractor, we need hesitate no longer. What the result of the trial of the case which is to take place on the 26th inst., may be, we of course cannot foretell, but it is certainly time that such a grave scandal as the matter had become should be ended. There is more than one question at issue. The works are two years behind time, and the contractor, whether rightly or wrongly we cannot pretend to say, has refused to remove certain stones, built into the wall, which the architect has condemned, giving as his reason that they were passed by the architect as sound before being placed in position. We regret the stand made by some of the aldermen, who cannot from the nature of their calling be expected to be versed in such matters, but who would nevertheless try to settle the difficulty by ways totally unsuitable and contrary to the strictly business principle that should and must be adhered to. Contracts exist between the city and architect, and between the city and the contractor, and the terms of these documents, ought to be sufficient to meet the difficulties which have arisen, and no doubt they are. Advice has been obtained by the city and also by the architect, as to the legality of the proceedings they contemplated taking. Little can be said pending the trial of the suit brought by the contractor, but for the honor of all parties concerned, it is to be hoped that the matter may speedily be settled, and the work proceeded with, as thus far the court house has been fruitful of little else than trouble. One thing is certain, viz., that the stone is unfit for the position in which it has been placed. One of the questions which the courts will be called upon to decide, will be, who is to blame for the stone being built into the wall and left there for several months, and then found to be in a state of decay. Stone that will decay in so short a period could never, we should suppose, have been passed by an intelligent architect or clerk of works, or be used for face work by a competent builder. The matter may hinge upon the quality of the stone selected. It is understood that samples of stone were submitted by all the contractors who tendered for the work; it becomes a question whether or not a sufficient quantity of the stone chosen, of a quality similar to the sample, can be procured. This important information should certainly have been obtained before the contract was let. We understand that it is the contention of the architect, that there is sufficient stone of good quality to be had from the quarry from which the condemned stone was taken. The evidence on both sides of the dispute, will be looked for with much interest, and it is much to be desired that a final and satisfactory settlement of the difficulty will be the outcome.

The well-known architectural firm of Langley & Burke, Toronto, has been dissolved. Mr. Langley will continue the business of the firm, while Mr. Burke has assumed the business of the late W. G. Storm.

The Superintendent of Water Works, Toronto, recommends that in the future water be supplied free to builders. It having been found impossible to collect more than about fifty per cent. of the water rates charged against builders, it is deemed unfair to honest builders to continue the system.

In our August number was published the results of recent examinations of the Province of Quebec Association of Architects, together with copies of the examination papers. In this connection the fact should have been explained that these examinations were not to qualify persons for registration but simply to admit students to study. There were no candidates for registration.

It is in the perfection of the details of sanitary work, in the careful observance of every essential requisite that will promote cleanliness and exclude all health destroying elements, that the competent master plumber reveals his skill, and it is just in these very points that we look for the difference between good and bad plumbing.

ODDS AND ENDS.



IN building brick houses in positions where they are not protected by surrounding property do not forget that hollow walls will add greatly to the convenience of the occupiers. They will render the house cooler in summer and warmer in the winter, and will assist materially in keeping the house dry. The cost of hollow walls is only very little higher than that of walls built solid.

* * *

During the hot weather that has prevailed of late it is of great importance in erecting buildings in stone or brick to thoroughly wet every stone or brick before it is laid. The water not only removes any dust that may have accumulated and would prevent the mortar adhering, but it causes a much better adherence between the bricks or stones and the mortar than would otherwise be the case, because of the tendency to suck up moisture in dry and hot weather. This may seem at first sight an item of little importance, but there is more in it than may appear.

* * *

What is the best paint for general iron work used in the construction of a building? Many prefer metallic paint, but experience has shown that for practical purposes nothing is better than red lead. The first cost is somewhat greater, but the increased durability renders it cheaper in the end. It should be added that the red lead should be applied directly to surface of the clean iron, not on top of a coat of oil or of metallic paint as is sometimes done.

* * *

A method of finishing doors and other woodwork that appears to be coming into favor is the following: The doors are of hardwood and are filled with a very dark filler; they are then polished in wax, when they present a semi-dull appearance that is somewhat pleasing. Ornamental beaded nails made of white metal are then driven in the doors at regular intervals but in a way to form a somewhat elaborate design of scrolls. Each of the doors leading into the same hall are finished in different designs as far as the nails are concerned, but the prevailing color is the same throughout. The effect is very good.

* * *

A paragraph that went the rounds of the architectural press about a year or so ago was to the effect that in Norway the custom is, in building in winter, to use mortar while it is hot, after slaking, with the object of preventing the mortar from freezing before it has time to set hard. The item is plausible enough, but the usefulness of the information is destroyed by the fact that lime that evolves much heat is entirely unsuitable for the use of making good mortar.

* * *

Painting is perhaps less understood by builders and architects than other branches of the building trade. For instance in finishing in the natural wood specifications frequently call for shellac and two coats of varnish in jobs where such a finish is not required. Shellac is probably the best first coat for hard pine that there is, but is not too expensive for ordinary work. "Liquid filler" or surfacer is largely used as a substitute in the United States and gives general satisfaction while saving at least one third of the cost, because the liquid filler is practically a varnish although it contains silice, starch or other substance that fills up the pores of the wood and stops suction. A little point that is not generally known even among painters is this: To produce the best results use liquid filler for the first coat and add about one third of the filler to the second coat. A third coat of varnish just as it comes from the cans will make a very good job. The writer recently saw a church the walls and ceiling of which were finished in pine that had been treated in the way described with very satisfactory results.

FIRE ESCAPES FOR PUBLIC BUILDINGS.

QUEBEC, AUGUST 19th, 1892.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—New York's and more recently Boston's new building law, as noticed and commented on in late issues of the *New York Engineering Record*, contain many pertinent provisions as to the safety of buildings against accidents by fire, or due to faulty construction; but I have not yet seen anything in them or in those of any other city, which thoroughly provides for escape in case of fire, from the upper tiers or galleries of theaters, assembly and lecture halls, academies of music and the like, or from the upper floors or stories of factories, colleges, convents, asylums, hotels and boarding or even tenanted houses, nor, in a word, from any building where there are large assemblages of human beings and especially when the old and infirm have to be dealt with, as well as the helpless infant.

Regarding such buildings, a provision of the "Boston Act" is that they shall have from each apartment (which, of course, also means from each floor or story) two independent ways of egress, one of which shall be enclosed in brick walls and shall have no interior openings other than the doors of the apartments from which it is an exit.

Now there is certainly no absolute safety in this proviso of doors opening from the inside into said stairway; for even though the enclosure be of brick and the stairs of iron, stone or other incombustible material, and that flames from below could therefore not run up through such a stairway and endanger the floors above, still the fact of any communication at all between the stairway and the inside of the building would allow all of the heated air and gases from the burning portions of the building to pass upward through such a well or shaft, and thus effectually cut off retreat in that direction.

On the contrary, any direct communication between the interior and the stair-case should be studiously avoided. The stairs should only be reached by passing out from the apartment on to an outer unenclosed landing, or open to the sky, and thence to the stairway; and as I proposed some years ago in a paper read before Section III of the Royal Society, I am still of the opinion and maintain that there is no other solution possible in the case of escape from a single or double series of rooms in a hotel or boarding school, etc., opening on a corridor with stairways at each end thereof, allowing the heated air and smoke from below to ascend and fill the passages, thus cutting off escape in the direction of their length, than by egress from each and every rear window of each and every floor above the first or ground floor, by stepping over the sill on to a continuous iron balcony (narrow and with lattice floor not to obstruct light to the window below) communicating with the stair-way—one or more according to the extent—the occupants of the front rooms having only to cross the corridor and escape through the window of the rear room opposite their own.

These stair-ways when in the rear and leading down to an interior court enclosed on all sides, should communicate with the open, the front of the building of street, by a fireproof passage-way leading from rear to front, and as such passage-ways need not necessarily be more than of mezzanine height, the exterior could be reached and the street level attained by a short flight of iron steps, without in any way cutting off communication between any of the ground floor rooms or corridors.

The only argument I have heard adduced against these continuous balconies all around the interior courts of a hotel, is on the score of want of privacy in case of a person from any one of the rooms prying into a neighboring apartment; but as there is not supposed to be any attraction towards the rear, the difficulty might easily be got over by posting in each room among other rules and regulations to be followed by the guests, "No access to rear galleries allowed except in case of fire" with the addition of curtains or frosting to the lower half of sash to render peeping in a profitless endeavour.

Where, as in a theater or concert hall, escape must be looked for in the opposite direction or towards the street or exterior, the same continuous balconies or verandahs can be made an ornamental feature of the several facades, or of one or more of them on the level of each and every tier of inside galleries or boxes, as lately done (I do not say in obedience to my suggestion, though sometime after I made it public) in a theater at Antwerp in Flanders, where each of the fire tiers of inner galleries communicates by some 25 doors or openings radiating from the auditorium with a corresponding series of outer balconies reaching first tier level by fixed iron stair-ways, and thence the street by folding stairs immediately detachable on the mere pressure of a foot spring, or where the first tier level may easily be jumped from without danger to life or limb; the non-existence of fixed stairs from street level being of course a preventive against access to the building excepting through the ingress door where tickets of admission are collected.

Such a system of fire escape galleries and stairs and passages I have computed not in any case to necessarily exceed from 3 to 5 per cent. of the total cost of any building it might be applied to.

CHAS. BAILLAIRGE, Architect, etc.

MONTREAL.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER).

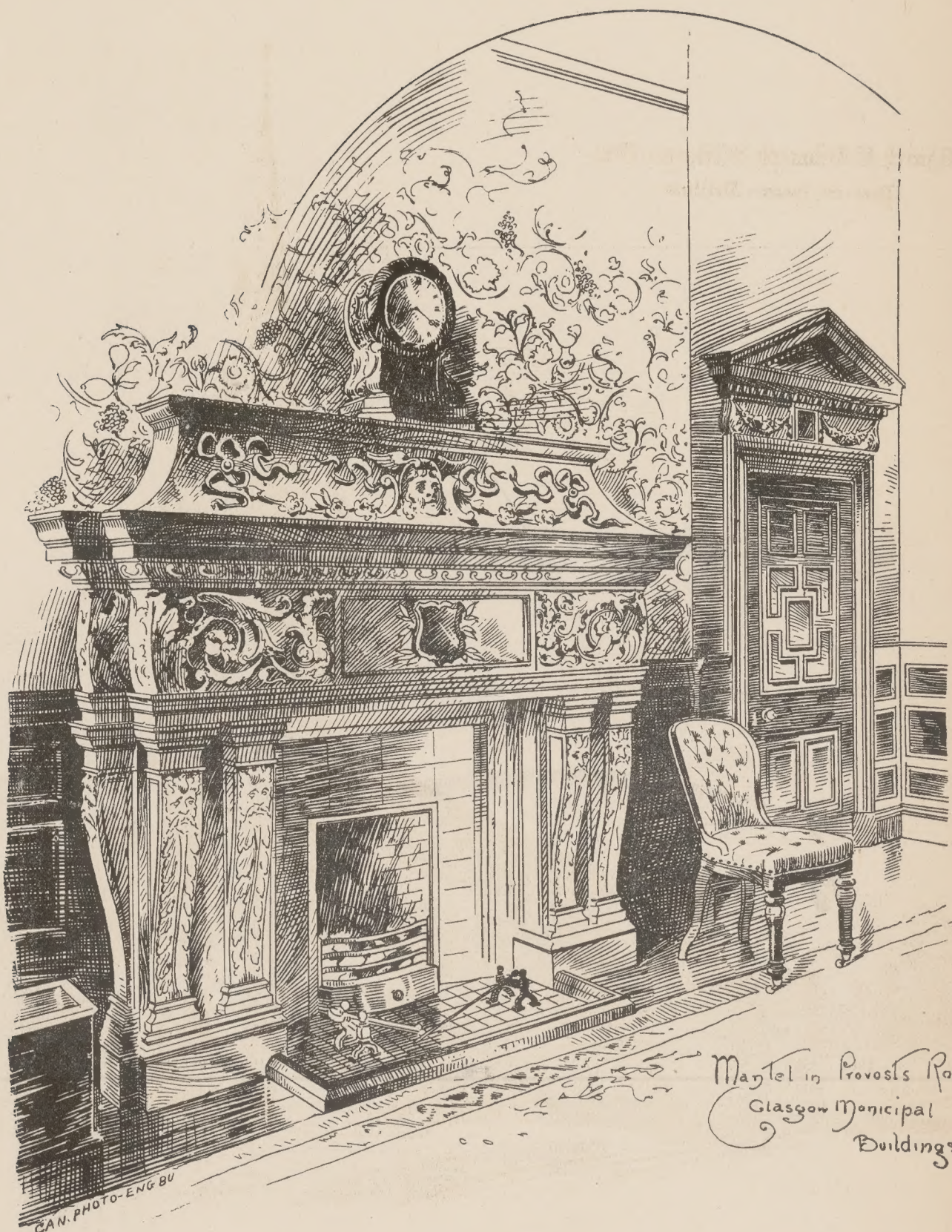
Following is the Program of the annual meeting of the Province of Quebec Association of Architects to be held on the 28th and 29th of Sept., in the rooms of the Association, 186 St. James St.:

Thursday, 28th., Forenoon—Annual meeting at 10.00 a.m.—reading minutes, report, &c.; President's address; election of officers; other business. Afternoon—2.30—Reading of papers by members. Evening—8.00—Annual dinner at the City Club, St. James Street.

Friday, 29th., 10.00 a.m.—Meet at rooms of the Association and drive to Victoria Hospital, new buildings of McGill College, and new High School. Afternoon—Visiting art collections, buildings, &c., at discretion of members.

Church of St. Joseph & Marys. Ont.
Post and Holmes Architects.



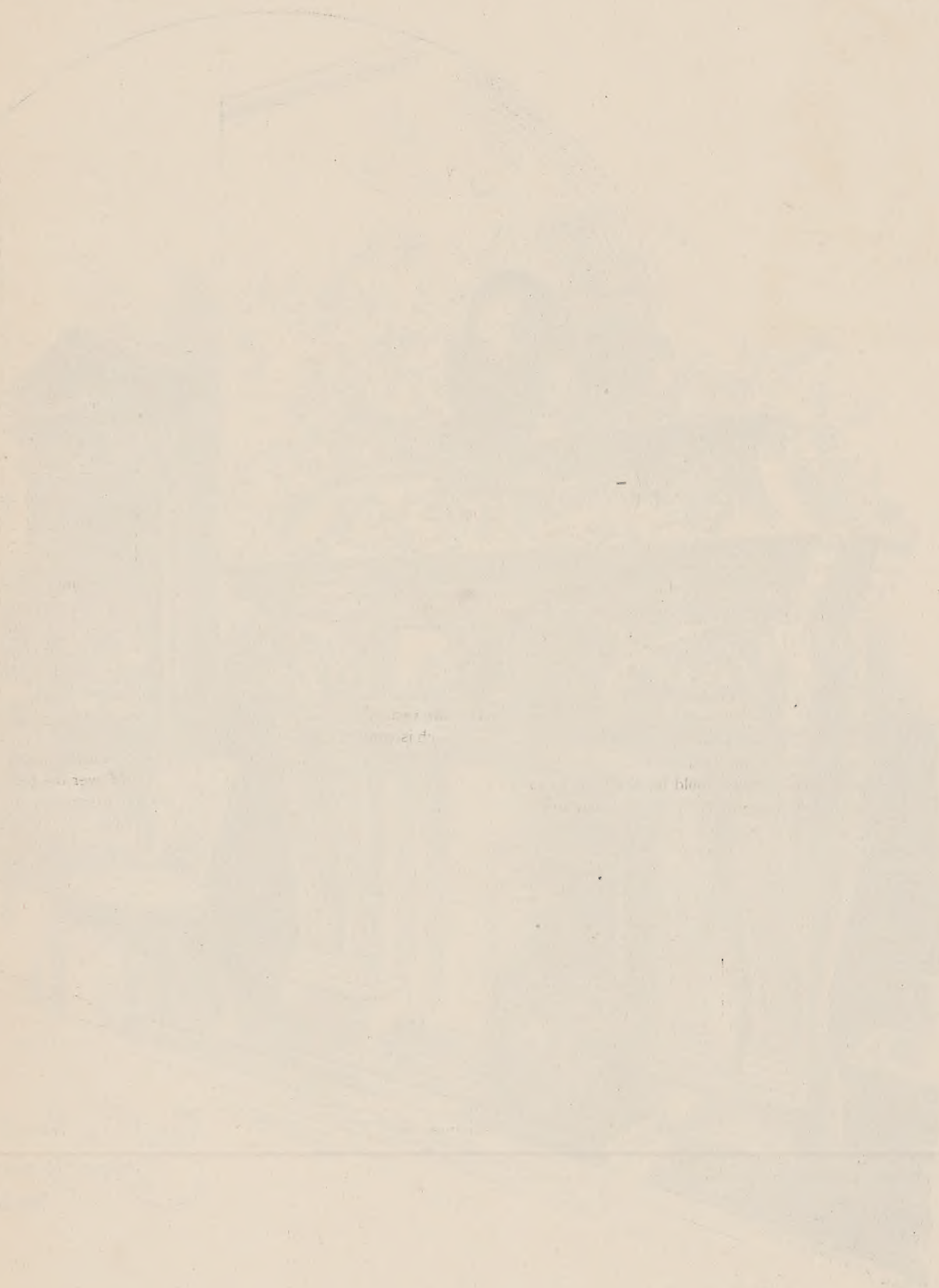


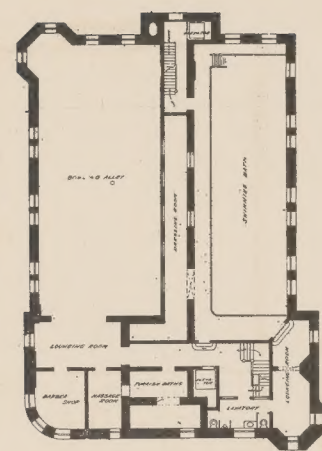
Mantel in Provost's Room
Glasgow Municipal
Buildings

[From Furniture and Decoration.]

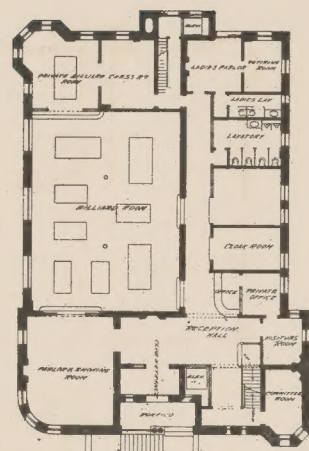
1871

1871

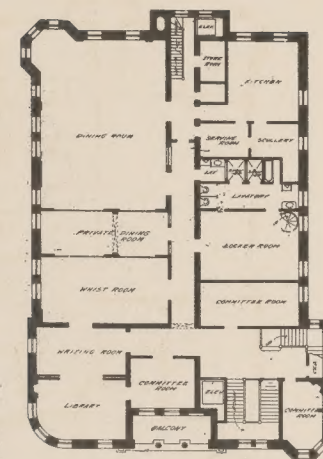




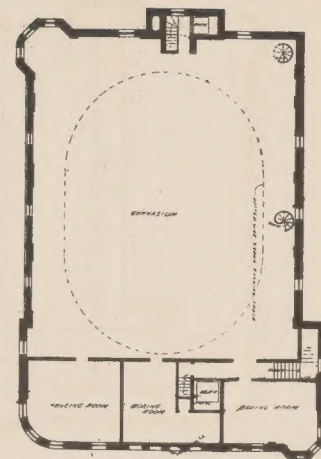
GROUND FLOOR PLAN



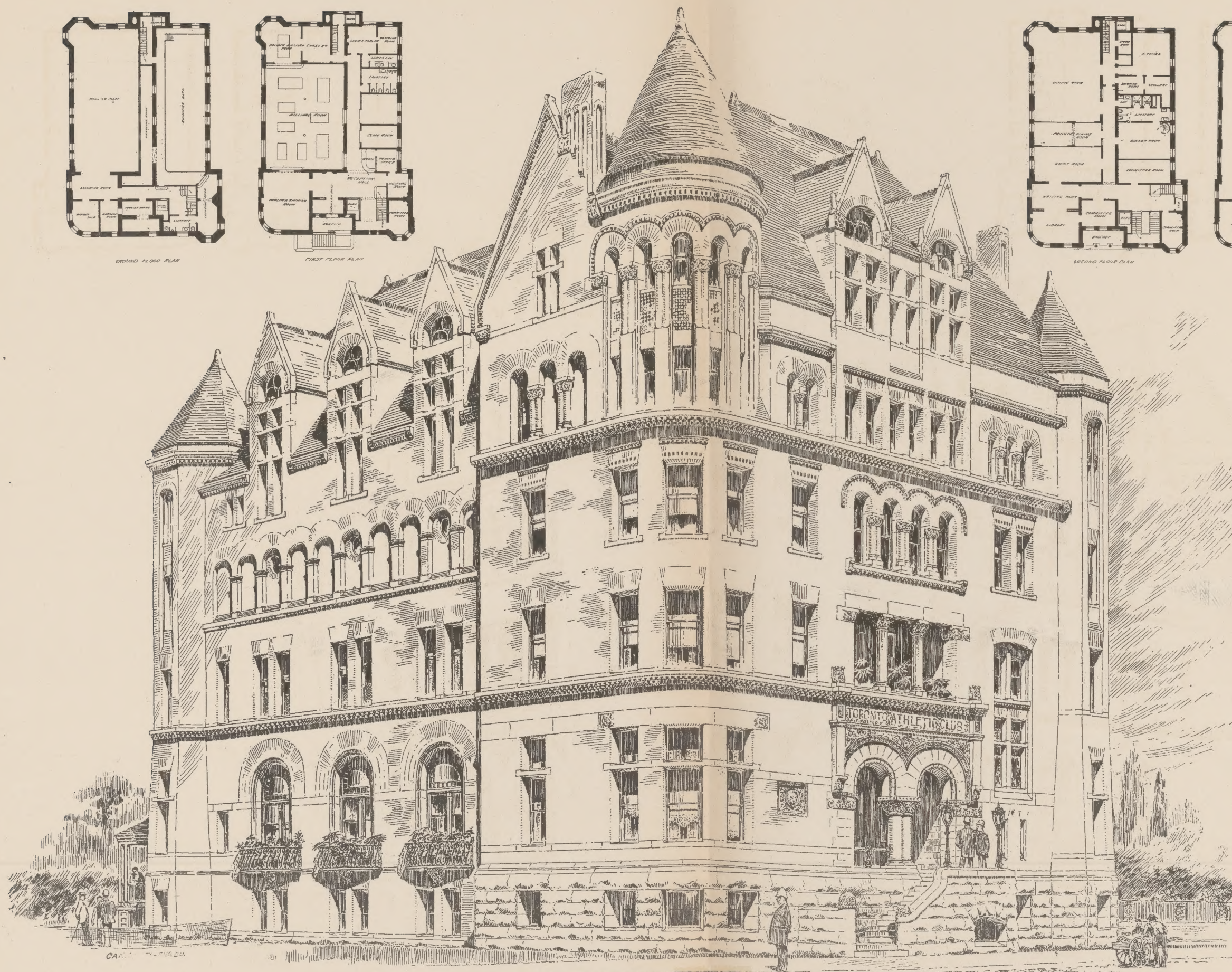
FIRST FLOOR PLAN



SECOND FLOOR PLAN



THIRD FLOOR PLAN



CLUB HOUSE FOR THE TORONTO ATHLETIC CLUB.

E. J. LENNOX, ARCHITECT.



THE VERANDAH IN AUSTRALIAN DOMESTIC ARCHITECTURE.*



tical uses and position of the verandah with reference to the plan; secondly, its treatment as an architectural feature.

The position of the verandah in respect to aspect is one of the chief points for consideration under the first head. The protection of the northern and western walls and windows from the hot summer sun usually decides its position, although for a summer evening lounge the western aspect is absolutely useless. In the cooler weather it might be so used, especially if the prospect is good, although the northern aspect will always be found more serviceable. Besides affording a protection to a building from the heat of the summer sun the verandah also serves to shield the walls from driving rain, such as we had experience of last July, which seems capable of penetrating almost any exposed wall of ordinary thickness. In the use of verandahs for winter exposures it must be always borne in mind that every room in the house should, where possible, receive the sun's direct rays into it during some period of the day, and that the more the southern and eastern walls of a house are exposed to the light of day the healthier will the house be. I think that even the rooms facing north and west should be designed so as not to be too closely sheltered from direct light, and that some means of introducing light above the level of the verandah roof or by glass skylights in the roof (opposite the windows of the rooms) ought to be made use of on the darker sides of the house if covered by verandah or balcony. By such means, and the use of movable blinds or shutters, the lighting and cheerfulness of a room could be completely under control, and many rooms cold and dark in winter brightened and made more habitable, whilst features might be made of the lighting in such a way as to improve the design. An illustration of a house was published some time ago in a professional journal in which this plan was adopted. So far, I have only been taking into consideration the lean-to shade so generally adopted here which does duty both for a protection to the house, an open-air living room, and as often as not simply a source of pride to its owner, especially, I am sorry to say, if showing a lavish display of cast-iron vegetation. It is to our American cousins that we are indebted for the most thoughtful arrangement of the verandah as regards both practical use and appearance. In many cases it can hardly be called a verandah; "piazza" is the name they give it, and it forms what really is an open-air living-room of rectangular plan and independent roof. It is open on three sides, but can easily be enclosed at pleasure by means of blinds or shades. It is usually on a secluded side of the house and facing the garden, approached from a side-door or garden entrance, and has the advantage over our usual narrow form of being wide enough to allow all to sit face to face. For the summer weather nothing seems more adapted to this climate, and yet it has come very little into use, people preferring the long narrow strip of floor to the roomier plan. As to the balcony, although most of the fore-

going applies to both verandah and balcony, it is of course not so much used as an open-air resort, being on the bedroom floor and in a more private position. It therefore may be of smaller area and accessible both from rooms and from some public thoroughfare. Its prospect, of course, will influence its position, but the protection it affords will be its chief use.

Having thus far only dealt with the verandah as a convenience, I will next turn to its treatment as an architectural feature, but before doing so would like to draw your attention to its appearance and use in the styles which are the basis of the architecture of the present day. It is not necessary to go further back than the Greek temples, the colonnades of which are familiar to you as their chief embellishment, as well as being a convenient shelter from sun or shower. The same, of course, are found in the Roman examples, sometimes in the form of a portico, and sometimes in the complete peripteral arrangement. In the houses we find the prototype of the Gothic cloisters in the peristylum, a central open court with a fountain in the centre and a covered colonnade all round, where sun or shade might be enjoyed at pleasure. This feature became the cloisters of the Gothic, in which the ecclesiastics took their exercise, and on which the Gothic architect displayed his most elegant taste, if not his highest genius. These are found connected with nearly all religious establishments of the Middle Ages, surrounding as they did in old Roman houses a central square or garden. These cloisters, or rather the arcades dividing the cloisters from the open squares, exhibit some of the finest examples of Romanesque, with their richly carved shafts and arches. The Moors, too, loaded this feature with a lavishness of ornament, brilliance of color and gracefulness of form that have been the admiration of us ever since. The private courtyard, with its surrounding cloister or arcades, remained in extensive use in Italy and Spain right throughout the Renaissance, as many of the palaces testify, whilst the external colonnade is also to be found, as for example in the Gothic palace of the Doges at Venice, and the later Renaissance of the library in the same square. Beyond its introduction in the porticoes of the Renaissance, the external use of this feature did not find much favor in England. Sunlight was too highly valued, and obstructions to it were avoided. There is, however, one very curious instance of its use to be found in Chester, where the first floor walls right along the streets are recessed some 8 or 9 feet back, making a covered walk which is continuous along the top of the ground-floor shops. The storeys above, which are supported on heavy wooden posts, keep the line of the ground floor and form a roof over the first floor balcony. This peculiar feature of Chester struck me as very curious when I first saw it, and as far as I know it is unique. It would be interesting to hear what was its origin if any present can explain it. It is in the East, in India, China, and Japan, however, that we have the most extensive use of the outside verandah. There its necessary application to the smaller buildings and houses brought it into use in simpler and lighter forms than we find in Europe. The materials, too, being less massive, tended to alter its appearance to a less imposing structure, and although the large temples and palaces were surrounded by ponderous pillars and elaborately-covered approaches the houses, especially in Japan and China, were of very light construction, little more than open-air verandahs or living-rooms separated and enclosed by screens and mats. From the architecture of these nations a good deal could be learnt as regards the design of picturesque and effective verandahs, which in their hands are always artistic and usefully simple.

As external features the verandah and balcony have great importance, many domestic buildings here carrying all their architecture on their verandahs, while their prominence and the strong effects of light and shade which they afford often make them the governing features of the design. In many of our larger mansions they form arcades or colonnades surrounding the building, with columns and orders of the same material as the main block and after the manner of the Italian Renaissance, and if of good design give an imposing and substantial appearance. They are seldom, however, treated with much picturesqueness in this style, and so have a formal and somewhat depressing effect (especially if carried out in stucco), which suggests a similarly formal interior. The less stiff intermixture of Classic detail and Gothic grouping which we find so picturesquely blended in the later Elizabethan architecture of such buildings as Holland House,

* From a paper by Mr. W. M. Campbell, read at a meeting of the Victorian Institute of Architects, and published in the *Australasian Builder*.

where the arcaded verandah is extensively used, should afford some useful hints as to how to treat our large houses with piquancy as well as dignity. The most objectionable form that this most useful adjunct to a house has taken, and one peculiarly Australian, is that in which ornamental cast-iron is such an important factor. Every portion of these erections is as a rule a jar of the artistic nerve. When one comes across such examples as I have sometimes had the fortune to meet with in my walks, as, for instance, brackets composed of a few ragged cast-iron leaves, painted a brilliant green and forming a perch for a cast-iron cockatoo in natural colors; or, what is more common still, a verandah front representing a sort of nightmare of Fern-tree Gully, one begins to look apprehensively at the gardens in fear of alighting on a crop of cast-iron shrubs. I do not wish you to understand that I think that cast-iron is a material which cannot be treated artistically, though as a matter of fact it very seldom is, and never when any attempt is made to copy the delicate and flexible forms of nature. The necessary slenderness of the supports, and the wide spacing of the posts, make a design in this material structurally unpleasant to the trained eye. From the consideration of this class of design, which will doubtless hold its own in this city for a long time to come, one can turn with relief to the simpler and less pretentious forms which are now beginning to show themselves in our suburbs. Of these developments one of the principal is that of the bungalow form, in which the sloping roof of the house is continued to cover the verandah also. With these designs the posts require to be simpler and heavy with simple cut brackets in keeping with the style. In this style, too, I should prefer to see a change in slope of the roof at the junction of the verandah and house roofs, to accentuate the position of the house walls and to take the apparent weight of the roof off the verandah posts. Glancing at some of the designs published in the American journals we find great variety of treatment, from the heavy roof supported on rough stone piers to the elegant Classic wooden columns and orders developed from the early colonial architecture of the country, and all having a substantial and well-designed appearance, so often wanting in the work here. In some cases the treatment of the verandah seems too fussy and the striving after the picturesque too obvious to be altogether pleasing, but there is great originality and careful thought shown in a great number of designs. It is noticeable that the continuous balcony is not a common feature, with the result that the main building stands up boldly, and is an object for architectural treatment of the boldest kind, whilst the verandah roofs coming lower down give greater protection and allow of better proportions than when the balcony is introduced. In the American work there is much more unity in design between house and verandah than is usually to be found in the work, resulting to a great extent from the substantial manner in which the former is carried out.

INCANDESCENT WIRING.

BY C. W. SWOOPE.

THE proper installation of wires for carrying electric currents is a subject which has engaged considerable attention ever since electric lighting first became practical. Since this time it is of course natural that there have been progression and improvements in the methods of electrical distribution, as well as the manner of insulating the conductors. Insulation is the vital principle of the subject, and all efforts, which indeed have been many, interesting, and expensive, have been tending towards a perfect bridling of the "subtle fluid." For ordinary currents and voltages the present methods come very close to the object, but the subject is still fresh and unsolved in the minds of those experimenting with alternating currents of high potentials. The question is still asked by property owners, architects and builders, "Can electric lights be satisfactorily installed with safety from fire," and the answer comes without hesitation, "yes, if the underwriters' requirements are strictly fulfilled and the installation is put in by competent parties using the most modern appliances and material." Verily "competition has been the life of the electrical trade" in its true branches, especially in the manufacture of appliances and construction work, the former producing many forms and grades of apparatus to answer a single purpose, and the latter various modes of installation. Nearly all the difficulties and troubles in electric lighting stations or consumers' houses have been caused by defective wiring, and upon

this part of the system more than upon any other depends the success of the service. It is all well enough to require bids for this house or that, from the various contractors for the purpose of reducing the cost of wiring, fitting, etc., but the weak point heretofore has been not so strict specification requiring any special standard or systematic method of installation has been required. The consequence is that each contractor bids upon his own ideas of material, distribution and installation, the man performing the work for the least money generally being the successful competitor, which in many cases means, inferior material, poor workmanship and dissatisfaction. The insulation upon wires has been much improved in late years. In the early days of electric lighting wires were covered with cotton and coated with paraffine, much resembling our present bell wire, but this was found to be very inflammable, and in a short time it was replaced by a wire covered with cotton and white lead, and which is still known as Underwriter's wire, being then accepted by that body as a fire proof insulation and hence supposed to be safe. Later, however, it was found that it absorbed considerable moisture, causing leakage and fire by this means. "Protection against moisture meant prevention of fire," and accordingly our various rubber compound coverings made their appearance, and have developed into first-class but in some cases costly insulations. The tendency of the present time is not to place such expensive coverings upon wires, but to run them in conduits or tubes, which are lined with an insulating compound and covered with a metallic covering, protection from surrounding bodies being an insulation, as the word itself implies, bare wires of course being possible if entirely insulated. Wires were first run in tin or lead tubes, then cleated with wooden cleats or iron staples to girders, ceilings, walls, etc., in a promiscuous manner; later they were encased in wooden mouldings, or run upon porcelain insulators. Now, our standard wiring, from the points of safety, convenience, economy and, above all, accessibility, is undoubtedly the system of tubes or interior conduits. This is by far the safest and most reliable system, as a house can be tubed from top to bottom, with all necessary junction boxes impaneled in the walls, and the wires drawn through after the building has been completed, thus avoiding any broken wires, cut by nails or the plasterer's trowel. The advantages are many and obvious; the increased insulation or protection at a moderate expense, and the accessibility to all lines of repairs or removal, as one wire may be drawn from a tube and another readily inserted. The system of laying the tubes in a systematic manner is certainly a great advantage over the old way of running the wires in any direction, the rule generally being remembered that "a straight line is the shortest distance between two points," and, of course, requires the minimum amount of wire. The tubes are run in much the same manner as a line of gas or water pipes, and all forms of elbows, couplings, connectors, etc., are made for the various bends, turns, etc. With such a system the contractors are compelled to bid upon and furnish standard appliances and apparatus, the work is done in a more systematic manner and satisfaction and better service results.

—*Electricity.*

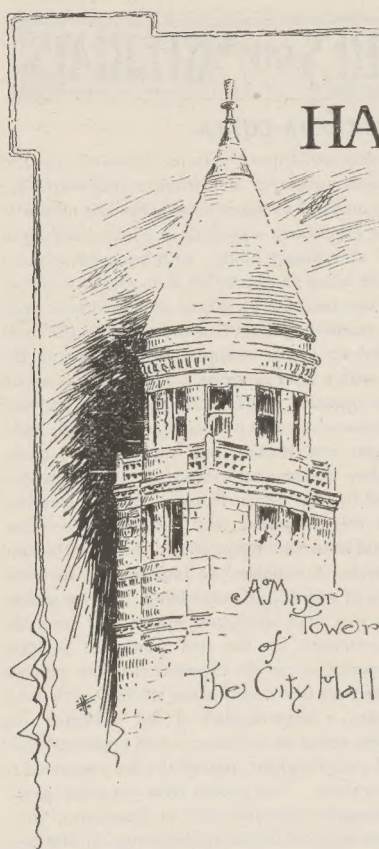
PERSONAL.

Messrs. W. J. Borroughes and Joseph Wright, two representative plumbers of Toronto, were recent visitors to New York.

Mr. Hamilton Killaly, C. E., who for many years was employed by the Dominion Government on the St. Lawrence canals, died a few days ago at Morrisburg, Ont.

The *Evangelical Churchman* pays the following tribute to the Christian worth of the late W. G. Storm: "It is not chiefly as a prominent and successful architect that we desire now to speak of him. It is rather as a Christian man. He was a member of the Church of the Redeemer, and at the time of his death was one of its lay delegates to the Synod. He took the deepest interest in all church matters. In his own church he was a zealous worker in connection with the St. Andrew's Brotherhood, and delighted in helping and encouraging his younger brethren to fight the good fight of faith. In that work his loss will be keenly felt. Mr. Storm was a strong advocate of temperance principles, and many a poor victim of the alcoholic temptation has found in him a sympathetic friend and helper. No one knows the amount of quiet good he has done in behalf of the helpless and needy. We extend our heartiest sympathy to his widow and family in their great affliction."

The Burlington Pressed Brick and Terra Cotta Company (limited), has been incorporated with a capital of \$30,000.



HAMILTON

THERE is a fair amount of work going on here and prospects are rather encouraging. Messrs. Wood, Vallance & Co. will erect a large hardware ware-house at the corner of Hughson and King William Sts., under the direction of Architect Stewart.

There is some talk of putting up an office building on the corner of James and Main Sts., where at present there are some old wooden shanties which badly need pulling down. Architect Hills is putting up a weigh house at the John St. Market. Architect Balfour is going to put up a Grand Stand for the Hamilton Jockey Club to seat about 2,000 people, and also a Road and Club House.

The remodelling of the Grand Opera House is nearly completed. The accommodation will be largely increased, and for the amount of money

expended the effect will be fairly good, but the carving is lifeless and too coarse. In some places where it is only a few feet from the spectator, it is coarse enough for the top of the building, and the faces of dramatic and musical celebrities are mere caricatures. It is a great mistake to introduce the human figure in carving unless it is going to be executed thoroughly well.

Mr. Geo. Tuckett's large residence on Queen St. is rapidly rising from the ground and looks very well; the carving, however, is so far disappointing; it has the common fault of being too coarse and lacks spirit. It is mostly in "Victorian Gothic" style with a little Italian Renaissance thrown in as it

Architect Mills is building a Sunday School for Zion Tabernacle at the were, a rather incongruous medley! corner of Pearl and Napier Sts., which is nearly completed.

There are a number of private residences being erected in all parts of the city.

CONDITIONS OF CONTRACT.

THE following conditions of contract have been adopted by the Queensland Institute of Architects and Queensland Builders, and Contractors' Association:

1. In the construction of these conditions and specifications, the singular number of the following words—namely, "employer," "contractor," "architect"—shall, where necessary, be taken to include the plural; the word "employer" shall mean the person or persons entering into the agreement with the "contractor"; the word "architect" shall mean the architect or firm of architects entrusted with supervision of the works.

2. The contractor, unless otherwise directed by the architect, is to provide all plant, scaffolding, tools, labour, and materials necessary for the due and proper execution of the several works included in this contract, according to the true intent and meaning of the drawings and specification taken together.

3. The architect during the progress of the works shall be the sole judge of all matters arising out of the contract, so far as relates to the quality of materials and workmanship, the interpretation and meaning of the plans and specification, the rate of progress, and the general management of the works; and against his decision, provided it be just and impartial, there shall be no appeal. Wherever the dimensions are written or printed upon the drawings, such dimensions shall be taken in preference to the measurement by scale. In the event of any discrepancy between the drawings and specification the architect is to decide which shall be followed.

4. The whole of the works comprised in this contract shall be executed with materials of approved quality of their several kinds, in the most substantial and workmanlike manner, and to the entire satisfaction of the architect.

5. All work and materials deposited on the ground, adjoining ground, or pathway by the contractor or by his order, for the purpose of forming part of the works, and on which an advance has been made, are to be considered the property of the employer, and the same are not to be removed or taken away by the contractor or any other person without the written consent of the architect. The employer is not to be in any way answerable for any loss or damage which may happen to any such work or materials, either by the same being lost or stolen or injured by weather or otherwise.

6. Should any workmanship not in accordance with plans and specification, or materials of improper or inferior description be introduced in any

part of the works, the contractor shall, upon receiving the architect's written instructions, cause such workmanship or materials to be removed; and if the instructions so given shall not have been carried out within the time stated for that purpose, the architect may employ other persons to remove the objectionable workmanship or materials; and all expenses, loss, or damage thereby incurred shall be charged against the contractor, and be deducted from any money due or that may become due to him.

7. The architect shall have power from time to time, but only by an order in writing, to make any alteration, whether additions or deductions from the works as set forth in the accompanying drawings and specification. In the event of any such alterations being made, the contract shall not be vitiated, but the value thereof, if not previously agreed upon, shall be fairly and justly fixed by the architect in accordance with the schedule of prices annexed, if any, or where same may not apply, at fair measure and value. In case of disagreement between the architect and contractor as to the value of such alteration, advantage may be taken of the "arbitration clause" hereinafter provided.

8. The building from the commencement of the works to the completion of same is to be under the contractor's charge; he will be held responsible for, and must make good all damages occasioned by any cause whatsoever, except such damages be caused by lightning, unusual floods, or earthquakes (provided such damage does not arise through any neglect of the contractor), and he is to hold his employer harmless from any claims for injuries to persons, or for damage to property through his neglect.

9. The contractor is to insure the building in an approved office, in the joint names of the employer and contractor, against loss or damage by fire, for the full amount of the contract, as soon as the building shall be covered in (or in the case of wooden buildings, as soon as the framework is erected), and must lodge with the architect the policies or "cover notes," and receipts for the premiums for such insurance. All money received under any such policies are to be applied in or towards the rebuilding or reparation of the works destroyed or injured. In case of neglect on the part of the contractor to insure, the employer may do so and deduct the amount of the premiums paid from any moneys due to the contractor.

10. The contractor shall not absent himself from the works without having a fully authorized and competent foreman or agent to act on his behalf. Any notice or order given to or served upon such foreman or agent, shall be considered as served upon the contractor, who will be held personally responsible for his proceedings and acts.

11. The contractor shall not sublet the work or any part thereof, without the permission of the architect. The architect may order the discharge of any workman for misconduct or incompetency, and such order shall be immediately acted upon by the contractor.

12. The contractor will be held liable for all violations of law caused by obstructing streets, side-walks, etc. He must give to the local authorities all requisite notices, and must obtain official licenses for hoarding enclosures, opening into common sewers, etc., and pay all proper and legal fees and charges. The contractor must keep up lights, etc., as required, construct proper enclosures, fences, and walks, for the protection and convenience of the public during the progress of the works. In case of any necessary excavation, the contractor must give due notice thereof to the proprietor or his agent, as also to the occupier of the immediately adjoining premises, and he will be bound to make good any damage that may be caused to such adjoining premises or buildings.

13. The contractor shall set out all the works comprised in this contract, but the employer shall survey and peg out the boundaries of the land on which the buildings are to be erected, and point out to the contractor prior to the commencement of the works all such surveys, boundaries and pegs.

14. Should the contractor not commence operations within seven days after the date of signing the contract, or should it at any time appear to the architect that there are not sufficient workmen engaged upon the works, or that there is not sufficient material upon the ground to enable the works to be completed by the specified time, the contractor shall, within 48 hours after receiving notice in writing from the architect, commence operations, or cause such number of competent workmen to be employed, or such quantity of material to be placed upon the site as he may direct. Should the contractor refuse or neglect to commence operations, or to employ such additional workmen, or to place such quantity of material on the site, or at any time during the progress of the works refuse or decline to execute anything set forth in the drawings and specification, or that may be ordered by the architect as necessary for the proper execution of the works, the employer, by the architect, may, after giving three days notice to the contractor, take possession of the works and adopt such means as may seem best for the completion thereof. The costs so incurred in finishing the works with all charges for overtime shall be borne and paid by the contractor, and shall be deducted from any moneys due, or that may become due to him.

15. If the contractor shall become bankrupt, or compound with or make any assignment for the benefit of his creditors, or shall suspend or delay the performance of his part of the contract, the employer, by the architect, may give to the contractor or his sureties, or assignee, or trustee as the case may be, notice requiring the works to be proceeded with, and in case of default on part of the contractor, or his sureties, or assignee, or trustee, for a period of—days, it shall be lawful for the employer, by the architect to enter upon and take possession of the works, and to employ any other person or persons to carry on and complete the same, and to authorize him or them to use the plant, materials, and property of the contractor upon the works, and the cost and charges incurred in any way in carrying on and completing the said works are to be paid to the employer by the contractor, or may be set

off by the employer against any money due, or that may become due to the contractor.

16. The contractor is to complete and deliver up the whole works which are included in this contract on or before the—day of—; in default thereof he shall become liable for the sum of — per — for each and every — that the work remains unfinished or undelivered after the said—day of— provided that possession of the premises be given the contractor, and lines and levels of the building furnished him, within—days of the acceptance of tender. All such sums to be deducted from the balance due and charged as by the way of liquidated and ascertained damages for delay of the works, or for cause of damages as per clause 8, and not as a penalty. Reasonable allowance in the time for completion of contract shall be made for delay of works on account of bad weather, legal holidays, and strikes amongst the workmen employed.

17. Payment shall be made to the contractor at intervals during the progress of the work, as follows—viz., upon the certificate of the architect, at the rate of—per cent, upon the value of the work actually executed. The remaining—per cent, shall be paid after the architect has certified that the contractor has executed and completed the work to his satisfaction, except a sum equal to 2½ per cent, on the total amount of the contract, which shall be retained for a period of—weeks from the date of the last or final certificate in order to ensure the execution of any reinstating of improper or defective work that may be required by the architect during the above period; such reinstating shall be performed to the satisfaction of the architect before the contractor shall be entitled to receive the said balance of 2½ per cent. No payment whatsoever, whether progressive or final, will be made except upon the certificate of the architect.

18. No progressive certificate is to cover or relieve the contractor from his liability under the provisions of clause No. 6, whether or not the same be certified by the architect at the time of or subsequently to granting any such certificate.

19. The certificates for payment of instalments are to be payable at sight by the employer, and the contractor shall, in addition to his right of his immediate action on nonpayment of any such certificates, have also the following rights and remedies:

1. If the employer shall make default in paying any moneys to which the contractor may become entitled for seven days after the certificate of the architect has been presented to the employer for payment; or

2. If the work be delayed 28 days for or by reason of or under any legal proceedings taken by any other parties and not being caused by the neglect, default, or laches of the contractor, or seeking any remedy or claiming injunction in consequence of any neglect, default, or laches of the contractor, the contractor is to be at liberty at his option to suspend the works, and to require payment for all works executed, and all materials wrought up, and for any loss which he may have sustained upon any goods or materials purchased for the works, and in such case the contractor is not to be bound to proceed further with the works contracted for. The contractor is to be entitled to bank interest upon all moneys payable to him, payment of which may have been unduly delayed.

20. All drawings and papers whatever, supplied by the architect, are to be kept by the contractor on the works; and the contractor hereby undertakes not unnecessarily to expose or use them for any other purpose whatever than that for which they are held in trust by him—viz., the execution of the works contracted for; and, further, that he will, upon receiving his final certificate, return all such drawings and papers to the architect.

21. In case any dispute shall arise between the employer, or the architect on his behalf, and the contractor touching the value of any alterations, additions, or deductions, as referred to in clause 7, or as to sums to be deducted as liquidated damages for overtime, see clause 16, or as to cause of damages to works referred to under clause 8, the dispute shall be referred to the decision of two arbitrators, one of whom shall be a fellow of the Queensland Institute of Architects, and the other a member of the Builders and Contractors' Association of Queensland, with power to appoint an umpire. The decision of any two of the arbitrators, or of the umpire, shall be final and binding upon all parties concerned, and from it there shall be no appeal. The award is to be made within seven days, or such extended period as the arbitrators may decide upon from the date of submission, and it shall direct by whom and in what proportion the costs of such arbitration shall be paid.

22. In case the contractor or employer should neglect to appoint an arbitrator within one calendar month next after a request duly made, or after the time specified for the appointment of the arbitrators and determination of the matter as aforesaid, the employer or the contractor, as the case may be, may appoint an arbitrator on behalf of the other party, and the arbitrator so appointed shall have the same powers and authorities as if he had been appointed by the contractor or the employer, as the case may be. Forthwith upon the appointment of the arbitrators they shall proceed to hear and determine the matter so referred to arbitration.

23. This submission to reference, and the award thereon, shall become a rule of the Supreme Court of Queensland on the application of either party to this contract.

These are conditions referred to in the annexed agreement, made on the—day of—between the undersigned for—

In the presence of—

The Toronto Pressed Brick Co, the Ontario Terra Cotta and Brick Co., and Messrs. Taylor Bros., of Toronto, had each a very creditable exhibit at the Industrial Fair. The last mentioned Company also exhibited samples of glazed bricks in various colors of their own manufacture.

MANUFACTURES AND MATERIALS

POROUS TERRA COTTA.

TERRA cotta for fireproofing does not appear to be as extensively used in England as has been the case here, observes *Architecture and Building*. We note that special mention is made of an experiment made last month at Bishop's Waltham Hants. The experiment was made in a little building of the dimensions of one room of an ordinary house, with brick sides and a terra cotta floor above, the pieces being so dovetailed as to render it almost hermetically sealed. The floor was reached by means of a wide stair case, with an ornamental balustrade, resembling that of carved oak. In the room below faggots of wood were piled up to the ceiling. Round these at the bottom were placed tar barrels, with a layer of straw. The mass was set on fire and the fire burnt with great intensity. While this was going on most of the visitors ascended the staircase and stood on the floor, feeling the slabs from time to time to see if the heat was making any impression on them, but throughout the whole trial they maintained almost the same temperature, being quite cold. By-and-by the fierce flames lapped themselves round the staircase, cutting off retreat by that way, and had it been constructed of wood short work would have been made of it. However, beyond being slightly blackened with smoke, it remained as impassive as the floor above. The room was one mass of white heat, resembling in color molten lead. Had the floor fallen in at that time cremation would have been the fate of those in it. The party remained on the roof from half to three quarters of an hour a sufficient period to put the experiment to the severest test and so little had they felt the heat below that many shivered with cold. Immediately the visitors descended, a large number of the workmen and boys ran up the stairs and jumped about on the floor, which apparently had not in any way been affected by the great heat, though the fire continued to burn for a considerable time afterward. This porous terra cotta fire proofing material, which is being extensively manufactured at Deseronto, Ont., has gone largely into use in the erection of important buildings in Montreal and Toronto, during the last three years. It may be used to equal advantage in connection with brick, stone or wooden construction.

QUALITY OF BRICK.

THREE main points with reference to brick have to be taken into account, says *The Brickmaker*. 1. The power of resistance under pressure; 2, the appearance of the fracture, which should present an even texture, and a fine brilliant grain, without cavities in the interior, and neither ribbony nor stony; 3, the exterior, which should be smooth and regular, the angles and edges sharp and straight. When the size of the brick is equal throughout the mass it is a proof that the brick earth has been well prepared and the brick generally well made. A brick, when struck, should give forth a clear, ringing sound. Good brick are generally of a dark reddish brown color, and sometimes they show vitrified spots on the surface; it is not well, however, to depend too much on the last fact, for it is often only an indication of the amount of heat to which the brick has been subjected, while the clay of which the brick is made may be impure and ill prepared.

Bad brick are readily recognized by their reddish yellow color, but still more by the dull sound which they emit when struck; their grain being soft, they crumble easily and absorb water with avidity. A good brick should not absorb more than one fifteenth of its own weight of water; it should appear and, in reality, be dry. A brick that does not take up any water at all is too much burnt; the mortar adheres to it imperfectly, but is a good conductor of heat. Such brick may be used in damp soil and for pavements. When a brick left in water, either scales or swells, it is of bad quality and contains caustic lime. A brick which being made red hot, and then having water poured on it, does not crack, is of extraordinary and rare quality, and those which have borne the effect of moisture and dryness during two or three winters without scaling or cracking, are excellent.

In order to try if brick will bear the effect of frost, let one be boiled for half an hour in a solution of sulphate of soda saturated cold, and then suspended by a string over the vessel in which it has been boiled. In twenty-four hours the surface of the brick will be covered with small crystals; the brick is then to be immersed again in solution until the crystals disappear, and again suspended; repeating this operation for five days, the crystals reforming after each immersion. If after this treatment a number of particles of the brick are found at the bottom of the vessel containing the solution, the brick are incapable of withstanding the effects of frost.

IMPORTED VS. AMERICAN CEMENTS.

SACKVILLE, N. B., August 25th, 1892.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—I sincerely trust that the Government will not impose a higher duty on imported English cement; at present it is protected by a duty of 40 cents per barrel. The statement published by you of the failure and deterioration by age of Portland cement is not in accord with my 40 years experience. I have the statement of a very reliable firm of cement manufacturers, that buildings erected with their cement have been subjected to great wear and tear for more than 80 years and are still intact. The cement manufactured by this firm was used in the following lighthouses (as a rule a lighthouse is more exposed to the action of the sea and atmosphere than perhaps any other class of work): The new Eddystone, Bishop's Rock, Watling Island, The Sombrero, St. Catharines, The Minicoy (China), Dondra Head, The Welmaduwa, Ceylon, and no complaints of the failure of the cement have ever reached the manufacturer.

I have had American cement signally fail, putting me to great expense and inconvenience. I certainly will not try it again, at the head of the Bay of Fundy at least.

Yours truly,

RICH C. BOXALL, C. E.

SANITATION NEARLY HEAT

ELECTRIC HEATING.

SOME interesting and successful experiments in the line of heating by electricity have been in progress at Ottawa, Ont., for nearly a year past. The apparatus employed is the invention of Mr. Ahearn, general manager of the Ottawa Electric Street Railway. We reproduce from the *Western Electrician*, the following particulars and illustrations of the apparatus :

A cross-section of the electric boiler for car heating is shown in detail in Fig. 1. It consists of a shell or tube 2 of oval cross-section, within which is placed another similar but smaller shell

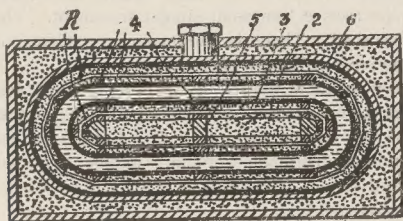


FIG. 1.

3, the two having their ends suitably joined to form a water space between them, nozzles being provided for the circulating pipes. The vessel thus formed has its exterior surfaces insulated with strips of asbestos 4. A core, 5, also insulated with strips of asbestos, and wound with a resistance coil R of German silver inserted in the inner vacant space of the shell 3, and is of such a size as to press the wires R against the insulation of the shell 3. A similar resistance coil R is also wound upon the insulated shell 2, the terminals of the coils projecting. The vessel thus formed is placed in a casing 6, the terminals of the coils passing through insulators, and all the vacant spaces inside the casing being filled with powdered whiting. This casing is then wrapped in sheets of asbestos and inclosed in a wooden box secured to the under side of the car floor. Two of the boilers are used in each car, being placed in diagonally opposite corners, each supplying a set of circulating pipes. The resistance coils are placed within the car circuit. The nozzle in the upper side of the boiler

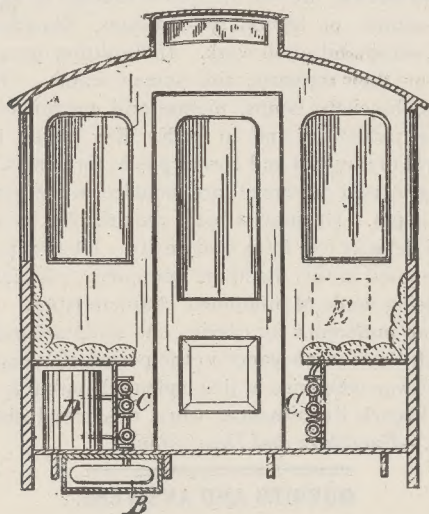


FIG. 2.

is connected with an upright supply pipe ; from this the radiating pipes C branch off, running to the other end of the car, where they are connected with another upright pipe. From this last mentioned upright pipe a return pipe passes through the floor and enters the boiler by the lower nozzle. A water reservoir D is placed under the seat and communicates with the flow and return pipes to keep the circulating pipes full of water and to compensate for evaporation. An expansion tank E is placed at the end, away from the boiler, one in each set of pipes. This tank being high and flat, is concealed in the end panel of the car, and it provides for the variations in the level of the car and the water.

The liquid heater shown in Fig. 3 was next devised. This heater is of handsome design, with a water glass on its side showing the height of the water within it. This type is wound for all

voltages, and has, it is stated, been used for the last three months with most satisfactory results by patrons of the Chaudiere Electric Light Company of Ottawa, which company uses the Westinghouse alternating system. These heaters are used by barbers, druggists and for domestic purposes. A livery stable keeper uses a three gallon heater, the hot water being

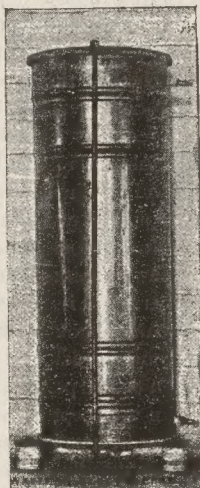


FIG. 3.

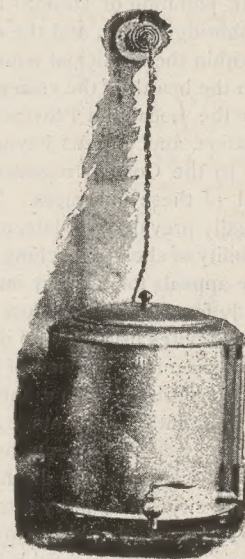


FIG. 4.

applied to clean harness and bathe horses' feet. The heater shown in Fig. 3 requires $3\frac{1}{2}$ amperes at 50 volts. Such is its construction that when in use in barber shops the water in it is found sufficiently hot for shaving in the morning, although the current has been off all night.

In March last Mr. Ahearn had constructed and put in operation in the residence of ex-Alderman Johnstone the electric furnace shown in Fig. 5. This outfit has been in successful and continuous operation since being installed, and has attracted much attention. The large coal furnace abandoned for the small perpendicular electric furnace shown in Fig. 5 suggests immense possibilities for electric heating. The heated water passes upward into the 63 gallon tank in the corner, from which it flows to the two upper stories of Mr. Johnstone's residence, supplying three bathrooms and one kitchen sink. The fact that

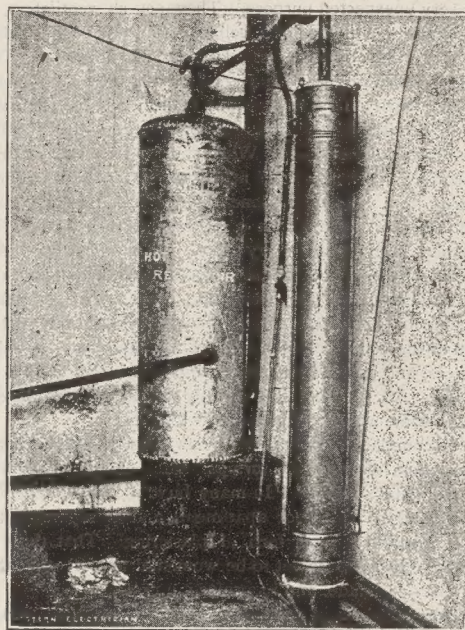


FIG. 5.

hot water is being constantly drawn off, and cold water taking its place, is a much more severe test upon the furnace than if the water was being used for heating purposes only, as in the latter case the water is being circulated always. Mr. Ahearn has applied this principle to the hot water apparatus employed for car heating.

Mr. Ahearn, proposes this year to equip all the cars, the car shops and the new power house, with his new system of electric hot water heating. He has also arranged with C. F. Sise,

president of the Bell Telephone company of Canada, to heat the new telephone building now being erected in Ottawa. This installation alone will require 6,000 feet of pipe. For this undertaking the 50 volt alternating current will be used.

THE SANITARY CONDITION OF TORONTO.

THE pollution of Toronto Bay by sewage, the filthy condition of Ashbridge's Bay, and the existence of twelve thousand privy pits within the municipal boundaries, have been a standing menace to the health of the citizens of Toronto for several years past. From the Local and Provincial Boards of Health, the medical profession, and citizens having at heart the city's welfare, have come to the Council repeated and urgent requests for the removal of these nuisances. Typhoid and diphtheria have been unusually prevalent of late, and notwithstanding there was the possibility of cholera reaching this country, a deaf ear was turned to the appeals for sanitary improvement. Now that cholera has actually found its way almost to our doors, the insanitary state of the city invites it to take up its abode and carry on its dreadful work in our midst. In view of the near approach of cold weather, there is a probability that the disease may not attack the city for some months. Advantage should be taken of this period to rid the bay of its foul contents and construct an intercepting sewer along the water front to discharge the sewage at a safe distance from the city. The privy pits, which are undoubtedly the source of most danger, should be closed up as fast as possible, and pending their extinction, should be cleaned at frequent intervals. The city's finances have been largely drawn upon of late for public improvements, but no false economy should be permitted to stand in the way of whatever expenditure may be required to guard the public health.

WATER AND WASTE PIPES.

THE leakage of water pipes behind decorated walls and in fine ceilings is a sufficient argument against casing or covering service-pipes. The repairs are generally costly in themselves, and they entail the additional services of the carpenter and decorator, as well as those of the plumber. Pipes in casings, or set in walls or partitions, as they pass from floor to floor, provide especially inviting runaways for mice, rats and vermin of all kinds. Nests are built in these places; scraps of paper, rags and food are carried into them, and they become filthy. It is only necessary to remove a covering board from almost any casing to prove this point in a most convincing manner. Even those in comparatively new buildings will be found surprisingly foul.

These casings, recesses or wall-pockets, as the case may be, serve another and usually very unexpected purpose. They act as ventilators, and distribute odors from the kitchen and cellar to all parts of the building. In the performance of this duty they are faithful and impartial. The hollow walls and floors which are nearly universal in the American system of construction greatly assist in this work. Many of the fine French flats which were first erected in the city of New York are now rented with difficulty, owing to the odors which pervade them. When shut up for a short time they are almost unbearable. Rents have of necessity been reduced to one-third the original figures, from this reason alone. The cause is usually found in the careless and ignorant arrangement of pipes and their cases. The odors from the kitchens are carried everywhere. Stale odors from closets and from food from kitchens and garbage-boxes are mingled and distributed with perfect fairness to all the occupants. The large air-shafts, usually held responsible for this state of things, have very little to do with it. The casings open at the ceiling of each kitchen, communicate with all the floor and wall spaces, and usually take their supply of odors from a point very near the range. All of them are directly connected with the cellar, and usually start in some way from the janitor's kitchen.

Numberless complaints coming from new flats of sewer-gas are finally traced to the odors of cabbage, turnips, ham, onions, etc., which have come from the janitor's kitchen. In many buildings this kitchen is directly under the parlor of the first-floor apartment, and is separated from it by one thickness of boards and an inch of plastering. That there should be foul smells on the first floor is not to be wondered at. Tests of the plumbing in these cases are made, and its protection proved.

There is nothing to be said upon the other side of the question. There are no good reasons for putting pipes out of sight. When people say, in the face of these facts, that they can't bear the suggestiveness of having the pipes where they are visible, they make an acknowledgement that they prefer hidden filth, danger to life, health and property, to a right construction. Life and health cannot induce them to accept and frankly tolerate their plumbing work.

Pipes carried openly through a building are not dangerous because their condition can be constantly observed. If accidents occur, the point at which the break takes place can be reached at once and repairs easily made. The quality of the work gains materially, because the plumber takes pride in putting up work which is to be exposed. He has a natural and very justifiable pride in having the workmanship creditable to himself. This

pride is increased by certain traditions of the trade, and there is a double gain to owner and occupant.

Exposed pipes may be made to pass through floors without leaving an opening. The floor around the pipe can be made perfectly tight, and the passage of odors cut off completely—at least, as perfectly as the nature of plaster will permit. This is an enormous gain, while the runaways for rats and mice, roaches and water-bugs, are entirely done away with. These vermin can then be exterminated. This is practically an impossibility in houses where casings protect them and afford perfect breeding-places. Cut off from free passage to all parts of the houses, they prefer more congenial quarters, where rapid transit and fields for colonization are provided.

As decorative features of the rooms, cast-iron pipes at least are often treated in a beautiful way. The body of the pipe is colored a very dark-bluish gray, scarcely removed from black. The bands are silver or nickel bronzed, or have silver or nickel leaf applied to them. Occasionally the whole pipe is finished with two or three shades of bronze. Lead and wrought-iron pipe receive somewhat similar treatment. The lead is often polished and varnished. There is, however, no difficulty in making the decoration of the pipes strikingly effective.

It is satisfactory to know that architects and builders are beginning to break away from the old custom, and expose their pipes wherever the prejudices of the owners can be overcome. Some of the best men in the profession are treating the plumbing work in a manner to show constructively its importance and value. The result is a great gain both to owner and occupant.—*Mechanical News.*

BRASS FOR DECORATIVE PURPOSES.

THE toughness of brass, allowing of economy of material in its use, so securing lightness of construction, together with its brilliant, enlivening appearance, has maintained it in constant favour for various articles of household furniture, while in chased, engraved and repoussé designs, cut open work and in the round, hammered or cast, it has become an important factor in interior decoration, the more so that it tends to harmonize neighbouring colors, as well as to form effective contrasts with hard woods, whether light or dark.

Its scope has been enlarged by the variety of tints given to it by certain superadded elements in the fusion of copper and zinc. Among these are golden orange, greyish green, violet moiré, olive and olive green, and brownish and reddish hues of different intensities, to which is to be added the effect of fire gliding, the peculiar lustre occasioned by which is altogether different from that resulting from the mere application of gold leaf to a metallic or other surface.

Decorative devices include antique or fanciful or ideal figures—human, animal or legendary—masques, flowering plants, arabesques, scrap and scroll work. In furniture, brass is utilised for tables or their supports, fire screen frames, chandeliers, candelabras, brackets, lamps, picture and mirror frames, fire dogs, cabinet mountings and so forth. Key plates, handles of doors, central ornaments and corner pieces for panels, usually in cast relief or incised ornament, are included in the general uses to which it is put. Decorative brass requires for its best effect pronounced designs free from complexity. Objects from nature when represented in this metal are commonly conventionalised selections being made of prominent characteristics.

The Italian preference for carving and sculpture over working in metals left brass in abeyance in the period of Italian Renaissance, but it was otherwise in that splendid outburst of artistic power, the French Renaissance, when this metal obtained full recognition.—*Furniture and Decoration.*

QUERIES AND ANSWERS.

A TORONTO subscriber writes: Upon taking down a building on King Street, I discovered a crack in the wall of the adjoining building, which, if subjected to a slight jar, would probably be the means of precipitating the front of the building into the street. This defective wall was in no way supported by the building which was taken down. I would like to know whether, under the law, any responsibility attaches to me by reason of my having caused the removal of the building to which I have referred?

ANS.—The law provides that you should give the adjoining owner six months' notice of your intention to remove the building. In default of such notice, you are liable for any accident which may occur to the defective building.

An increase of \$107,231 is shown in the value of new buildings erected in Hamilton the present year as compared with 1891.